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The Air Line Pilot

November, 1955

Radar Development — Page 3

Pilot Training — Page 5

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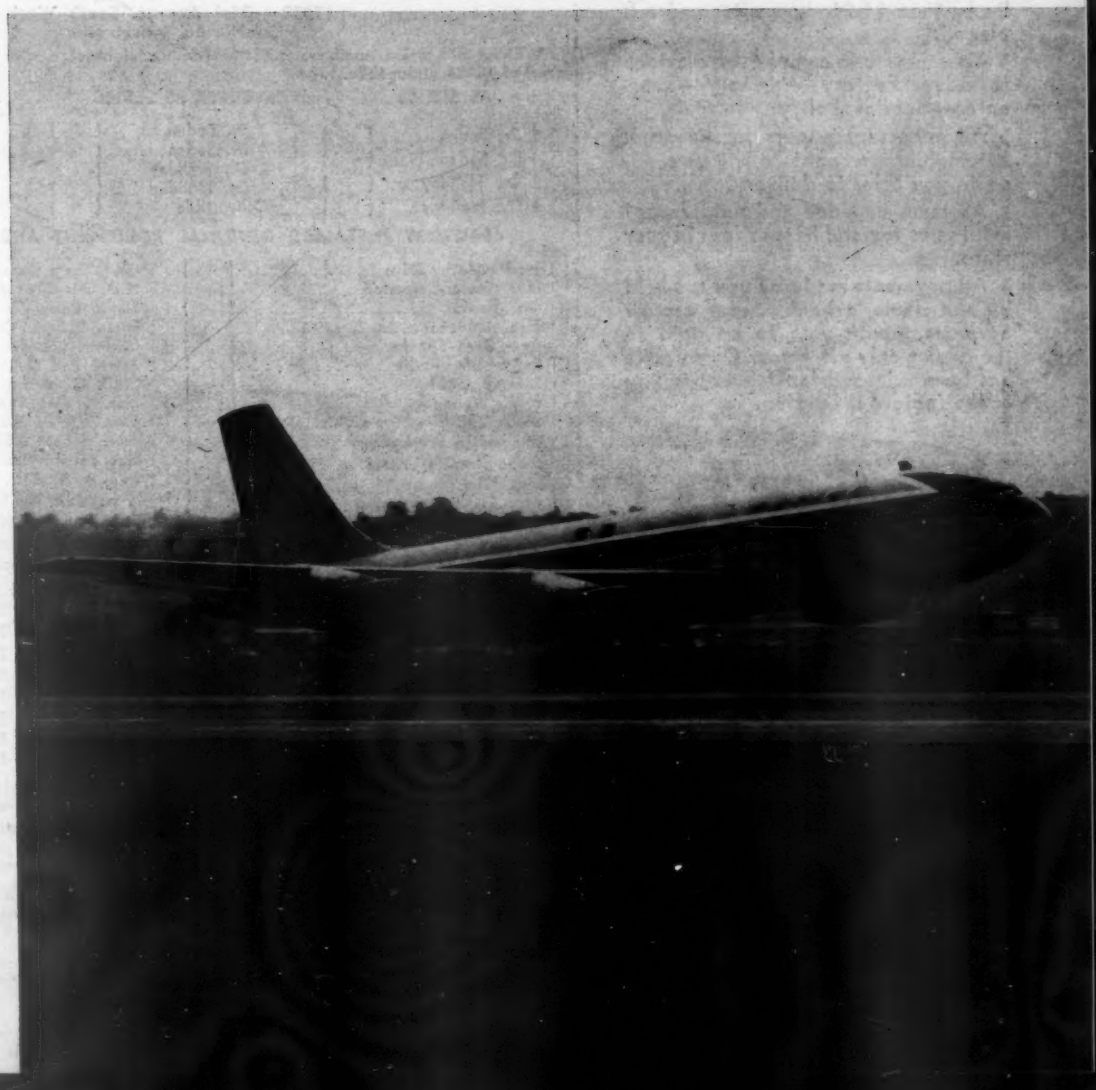

The Boeing 707
—Page 4—

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☐ 2 Dr. Holiday ( )	☐ 2 Dr. Holiday ( )	☐ 4 Dr. Holiday Dlx. ( )
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Radar: Where Does It Stand?

It Has Speeded Air Traffic Handling As No Other Device. But It Isn't Problem-Free. Here The Author Outlines Some Of Them And What Is Being Done About Their Solution

By Col. J. Francis Taylor, Jr.
Director, Air Navigation Development Board

At the risk of starting out with a controversial statement, I will announce my platform. Simply it is this: Radar has advanced the rate of traffic handling in the terminal area more than any other single device. I am a great believer in radar and, if I had my way, I guess I would put one on each airport; the capability, size, and complexity of it to be determined by the amount of traffic that the airport had. Although we have made a significant step forward by using radar in terminal areas as a traffic control aid, I do not think the end of its improvement is in sight. There is still a great deal of expansion left in the system, but in order to get the best out of radar, we must first lick the basic problems that now exist in it.

Anti-Radar Peeves

Each of you undoubtedly has his own list of peeves against radar, but my own goes something like this:

- There is a correlation problem existing between the radar scope and the strip postings now used in the centers;
- We do not have a big bright tube display that the controllers can see in a reasonably high ambient light;
- We still are searching for a method of showing altitude on a radar tube face;
- Identification of aircraft is not sufficiently simple to establish, and once established, it is difficult to keep the identity of the aircraft continuously available to the controller, and
- Radar is still subject to weather; storms, and some types of precipitation appear as noise or clutter on the radar scope, making it difficult to track aircraft.

These are a few examples that come to mind.

In this article, I intend to discuss the radar problems that have not been entirely solved in regard to safety and report on how the Air Navigation Development Board is contributing to the solution of some of the critical problems.

Specifically, we think that identity and weather clutter problems are very shortly going to be reduced in magnitude and that altitude display will be significantly helped. We hope to accomplish these improvements by means of a device called the radar safety beacon. This development may possibly be new to some and therefore calls for explanation.

ANDB Type III Radar Safety Beacon

The ANDB type III radar safety beacon system, as presently being evaluated at the Technical Development and Evaluation Center and scheduled for extensive in-service evaluation in the New York-Washington-Norfolk area early next year, is designed to expedite air traffic control by providing the ground controllers with continuous, reliable and easily interpreted indications of the position and identity of all equipped aircraft in the area.

This system consists of a ground station called a "Beacon Interrogator" and an airborne unit called a "Transponder" or "Safety Beacon." The ground interrogator, consisting of a transmitter-receiver, a pulse-pair generator, antenna and associated remote control and decoding equipment, is normally associated with an airport surveillance radar, such as the CAA type ASR-3. The interrogator antenna may be an integral part of the radar antenna or may be located a short distance away and "slaved" to it. Except for long range and other special displays, the beacon interrogator displays its signals on the radar PPI. The airborne transponder consists of a receiver-transmitter, an antenna and the pilot's control unit.

Operation Described

The operation of the radar beacon system may be briefly described as follows:

Every fourth radar pulse is preceded by a pair of L-band pulses from the interrogator. These pulses, in effect, ask the airborne beacons "Where-are-you?" Each time the signal is received, the airborne beacon responds with a four-pulse reply code on another L-band frequency. The time and direction of the reply from each beacon is shown on the radar display as a "paint" or "blip" at the range and bearing of the aircraft. This action occurs for any of the ten reply codes and thus all equipped aircraft are dis-

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Ed Modes, Editor

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played on the PPI, together with the radar returns from unequipped aircraft.

Because the safety beacon system operates at L-band, the signals are not appreciably affected by weather and the use of two L-band frequencies, one for interrogation and one for reply, washes out the possibility of rain or ground clutter on the beacon scope. Being a one-way system each way, the beacon is much less susceptible to fading, and is reliable to much greater ranges than a radar would be operating at the same frequencies.

"Decoder" Is Key Of System

An electronic sorting device called a "video interconnection equipment" or "decoder," with remote control units available at each traffic controller's display is the key to the utility of the safety beacon system. This device "cleans-up" the controller's scope by rejecting undesired signals and changing each four-pulse reply code to a single pulse or "blip." At the selection of the controller, the return from each aircraft replying with the selected code is marked with a second blip just behind the one which indicates the aircraft position.

When a selected aircraft is asked to identify, the pilot depresses his "ident" switch, thus automatically switching to code 10. The ground equipment then displays his signal as a solid bar. This code can also be used by the pilot to signal an acknowledgment, a position report, or, perhaps, an emergency. There are many possibilities in this field. These are being explored.

Ability To Identify

The ability to identify individual aircraft eliminates the time-consuming identifying procedural turn and reduces voice communications and the possibility of erroneous instructions. The easier we can make the controller's job of tracking and identifying aircraft, the more effectively and safely he can help you maintain schedules. The more flexible and automatic we can make the radar system the more it reduces the communications and other workload on you.

Beacons now being tested have ten codes, but the number of available codes can be increased tremendously with little or no increase in airborne equipment complexity. This would permit greater flexibility in the rapid identification of individual aircraft and the automatic signalling of aircraft altitude. Part of the test and evaluation program is to establish the optimum number of codes required for control of traffic in our most dense areas. The use of color for identity altitude displays and numerous other improvements to air traffic control can be achieved through orderly growth of radar and safety beacon systems.

Value Of Beacon

This beacon represents what we of ANDB believe to be a true common system item. By this I mean that it is completely compatible with the military beacon system. The air defense radar network is being equipped with ground interrogating devices which will interrogate civil beacons in the same manner as in the ANDB system. The military beacon will reply to federal airways operated equipment. The military beacon program is now in the process of implementation with air defense command radars now almost completely equipped. The microwave early warning radar at Washington and the FPS-8, which is being installed in New York for use of the traffic control center, are equipped. Military aircraft are rapidly becoming equipped with the airborne transponders.

On The Cover

The Boeing 707 jet prototype is shown landing on Boeing Field, Oct. 6, after a 3,038-mile non-stop flight, at an average speed of 550 miles per hour, maintaining an altitude of 35,000 feet for most of the time, according to company sources. The airplane flew as far east as Denver on the trip and as far south as Los Angeles before returning to Seattle. Boeing officials said that the average speed for the Seattle-Denver leg of the trip was 594 miles per hour.

The 1956 fiscal year budget of the Civil Aeronautics Administration, if approved, includes funds to purchase and install substantial quantities of common system ground interrogators for federal airways operated radars.

We are really enthusiastic about the program. The fact that all equipped aircraft can be seen by all military and all civil radars, we feel is of the greatest importance.

Opening New Vistas

Once identity and weather-free position information can be made known to the controller, we believe, we open up new vistas in rapid handling but nevertheless safe operation of aircraft.

For the moment, I would like for you to imagine with me some advantages that beaconry may give us. I mentioned earlier that the problem of altitude display might be partly solved by using the beacon. If we had enough codes, and I think we do have, it would be possible to have each altitude assigned a specific code; for example, 15,000 feet could be code 15 on the pilot's control box. When the controller wanted to assure himself of the altitude of two aircraft that were apparently on a collision curve, he would merely interrogate their altitude by means of the coding information available to him.

Next, Altitude Coding?

If this type of arrangement is advantageous, there is no reason why the next step in development should not be altitude coding, which works in conjunction with the aircraft's altimeter and changes its code automatically with discreet changes of each 1,000 feet. Altitude coding was a requirement of RTCA's SC-31 common system. It certainly is a nice feature if it can be arranged and I believe at last that the possibility is now fairly straight forward. Those of you, who are familiar with identification problems of aircraft entering coastal ADIZ's will appreciate the fact that a simple method of code switching might be arranged for individual flights which would positively identify inbound flights to air defense controllers and would obviate the need for the fairly complex maneuvers, which must now be executed. Air defense command radars by being able to identify all equipped aircraft could provide a much better storm warning service due to the fact that aircraft would not be obliterated by the storm when it was between the radar and the aircraft.

Benefits Ground Controller

It would not be fair in discussing the beacon if I did not admit that it is primarily for the benefit of the ground controller. This is a new departure in airborne equipment because I can think of no other case where instrument flying equipment in the aircraft was not put there for the pilot's direct benefit. The present trials now going on at Indianapolis are partly to test the beacon but also to get some ideas as to the number of codes that controllers think are desirable and to assist in working out some preliminary procedures, which will speed up traffic flow at no sacrifice to safety. Pilots will get an intangible benefit from the beacon, of course. We hope that this device, used in conjunction with radar, will increase traffic handling, safety, and enhance the pilot's feeling of security, or, as the English say, "Provide him with tranquility of spirit."

One Approach To Training

Pilot Training Is A Controversial Subject At Best. Herewith Is One Opinion Which Contends: Checking And Training Should Be Separate, But Still In Relative Balance

By William W. Moss
Asst. Chief Pilot, Training, PAA

Three years ago in presenting some line pilot views in "The Airline Pilots Look at Safety", I said: "An integral part of operations and safety is training. It is obvious that constant training and checking in both old and new procedures is one of the cornerstones of flight safety." Now, after a year and a half of being in charge of the training of more than 500 pilots of the Atlantic Division of Pan American World Airways, I find that I am still in complete accord with my feelings of three years ago. It is important, however, to put training and checking in the proper perspective.

Distinct Requirements

When discussing pilot proficiency programs you often find a tendency to lump them together, and to assume that training is being given a check ride or, conversely, that a check on a man's ability is being obtained during a training period. To a very limited degree this is true, but I feel very strongly that it should be realized that there are separate and distinct requirements for both training and checking and that these requirements can best be satisfied by separate treatment within the framework of an overall program, both ground and flight, dedicated to the attainment and maintenance of pilot proficiency adequate for the safe and efficient operation of the particular airline, and secondarily to the gradual raising of the level of competency in order to permit more efficient operation of present equipment and to be ready for the transition to future aircraft.

Checking is important for two reasons:

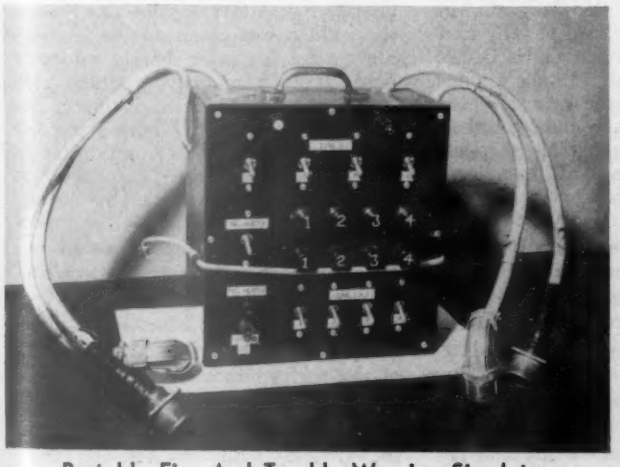
- It provides the measure of a man's ability. It is the "go, no go" gauge as to whether a pilot's skill is adequate to cope with the tasks he may be called on to face any time during his career. As such it has many implications in the moral, legal, financial, and regulatory fields.
- It shows the areas where training is necessary to raise the group standard and it pinpoints the individuals, who need more training than the average. This has economic benefits, because it permits the attainment of a high group standard with a minimum of waste of expensive training time on men whose proficiency is high.

Advocates 'Cold Check'

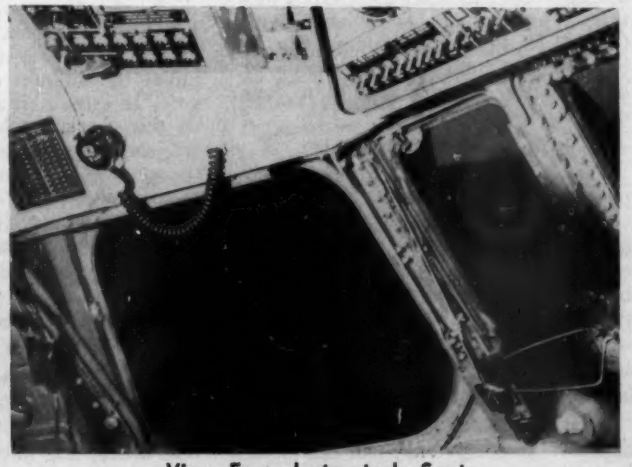
In order to achieve these benefits of checking, a man's ability should not be shielded behind recent training. This is why we advocate the "cold check"; namely, one not immediately preceded by a training period. Thus we get a good picture of how the man would have handled the problem; for example: two-engine landing, zero flap landing, engine failure on takeoff, etc., if it had occurred on his last scheduled flight. This may be an unpopular procedure with some pilots, but we believe it is consistent with the hard fact of airline life that unless a pilot is adequate at any and all times to handle an in-flight emergency, an accident is likely to arise out of an incident. But, how do you retain this ability to meet emergencies? You can't cut engines on scheduled flights, or make zero flap landings with passengers. Training is obviously the answer —realistic training divorced from the checking—training that covers the maneuvers that are not normally practiced by a pilot on routine scheduled flights, but which are likely to be encountered from time to time. This, then is the background reasoning, which has led to the evolution of the PAA Atlantic Division pilot training program for Captains and First Officers.

Periods Outlined

Briefly, this program consists of the following periods scheduled by calen-



Portable Fire And Trouble Warning Simulator



View From Instructor's Seat

"Hood" Down

"Hood" Up

dar months:

Month 1—Periodic Technique Check
Month 2—Link Trainer—DC-3 Refresher
Month 3——
Month 4—Ground School Refresher —4 days
Month 5—Periodic Instruction (Flight)
Month 6——
Month 7—Periodic Technique Check
Month 8—Link Trainer
Month 9——
Month 10—Ground School Refresher—4 days
Month 11—Periodic Instruction (Ground)
Month 12——

The months left blank may be utilized to provide flexibility in scheduling and the listed periods may be moved ahead or back as scheduling needs dictate. However, in compliance with CAR 41.53, Periodic Technique Checks must be accomplished twice each year at intervals of not less than four months.

Cites Accomplishments

We feel that this program accomplishes the following:

▶ **Provides a balance between training and checks.** The divorcing of check and training flights provides a better picture to both the pilot and the company of the pilot's proficiency while at the same time providing an adequate opportunity for practice and instruction.

▶ **Greater safety.** It is felt that a high level of competency will exist year round by spreading the training more evenly. This gives the pilots opportunity at regular intervals to come into contact with people, who can bring them up-to-date on new procedures and who can answer any questions that may have come to mind since the last training period.

▶ **More flexible scheduling.** Having to schedule around a maximum period of only four days, in contrast to almost two weeks when all training and checks are lumped together twice a year, makes for a more uniform schedule, which is advantageous to both company and pilots and is a safety factor in that it avoids disruption of normal routine.

Contents Of Periods

The best thought-out outline is useless, however, unless the details are properly filled in, so next I would like to show you what the listed periods actually are, what they cover, and why we give them.

The Periodic Technique Check is really the heart of the program, in that it is the legal requirement and in that the performance on it determines the amount of training a pilot gets. In establishing the items we give on this check, we have endeavored to get away from "just going through the motions." We make all maneuvers as realistic and as practical as possible by cutting engines just at V_1, by landing out of ILS approaches to minimum or below minimum altitudes, by doing three-engine go-arounds from right down at the flare point with gear down and full flaps, and by providing realistic fire warning signals by means of a "black box," details of which will be covered later.

In attempting to convey this realism, however, we try to balance the safety benefits to scheduled operations against the hazards of training. In other words, we feel that it is very poor policy to carry our realism to the point where we are seriously exposing ourselves to a preventable accident during training. Up to a few years ago, we cut the engines with the mixture control and either automatically or manually feathered the engine right down on the deck. That, however, was just a little too realistic although, undoubtedly, excellent training. After a few very close calls of confusion in the cockpit, poor technique, feathering the wrong engine, etc., we reverted to pulling back the throttle, being very careful, however, not to pull back into reverse. To simulate feathering, on the command, "Feather No. —," the training engineer sets zero thrust which, for a DC-6B, we calculate is 1200 RPM and 15" MP at 125-130 knots.

Critical Maneuver

We believe that one of the most critical maneuvers a pilot can face is the sudden loss of an engine immediately after V_1 on a barely adequate field. It is a maneuver, which calls for some very quick and correct actions, and they must be both quick and correct or a dangerous situation exists. So we emphasize this maneuver on both training and checks by cutting an outboard engine right at or immediately after V_1. Since most of our DC-6 training is done at approximately maximum landing weight on the 5000 ft. runways at MacArthur Field, the pilot gets a fairly realistic picture of the performance of his aircraft, especially on summer days.

Incidentally, holding an aircraft on the ground, while accelerating from V_1 to V_2, after losing an engine and

while the end of the runway and the obstructions are approaching at some 200 feet per second, is probably the most unexpected job a pilot will ever have to do, but it is extremely vital to the obtaining of the proper performance from the airplane. As such, I think it calls for emphasis in any pilot training and check program. I also think it calls for some engineering improvement in the provision of better aircraft control at critical speeds. 160# rudder force and full rudder pedal throw are just too much for ease of handling. Not only that, but they require perfect adjustment of rudder pedals, seat height and tilt, and seat fore and aft positioning in order to be obtainable.

The 'Black Box'

The "black box" referred to before is actually our "Portable Fire and Trouble Warning Simulator" developed by one of our training Flight Engineers, Dock Lee. A DC-6B model of it is illustrated with this article. By connecting this unit into the aircraft's fire warning system, it is possible to cause fire warning signals, both bell and proper lights, without the trainee being aware that any such move is being made. If an actual fire should occur the normal fire warning system is still operative, and if by some freak of chance an actual fire should occur, while a simulated one was being signalled, the proper light on the box glows to show that it is no false alarm.

This invention is uncomplicated, contains no tubes and has already been extended to give generator overheat warnings, which is only one example of its further use. A later model of this simulator permits pre-selection of the desired trouble, with actuation dependent on a single button. This permits an instructor to initiate the problem at the desired moment without having to take his eyes off the aircraft or instruments as the case may be.

Some interest has been evidenced in this device by other air lines and Pan American is glad to make information on it and wiring diagrams of it available as a contribution to flight safety, to any who are interested.

Low Visibility Take-Offs

In attempting to provide our desired realism further, we regularly do low visibility take-offs, which we feel are an improvement on our former instrument take-offs, wherein the maneuver from the start of roll was done with the hood up. By means of the "hood" which we now use, several pictures of which are shown here, we start the take-off run with the hinged flap down and the trainee with his vision relatively unimpaired. At approximately 10 knots before V_1, the Check Pilot raises the hinged flap and the rest of the take-off is then completed solely by reference to instruments. This simulates, as well as we have been able, the situation, where a pilot either runs into a patch of fog in the latter stages of his take-off run, or loses visual contact immediately after having broken ground. We make a great many full gross weight take-offs in the Atlantic Division into areas where, once beyond the end of the runway, there is no visual references available, only blackness, so we stress the necessity for going on the gauges under such conditions and completing the take-off with a proper balance between gaining altitude, accelerating the aircraft, and cleaning up from the take-off configuration.

The hood, which is illustrated is one developed by one of our Flight Instructors, Marvin Everett, especially for the DC-4 or DC-6B. The pictures, shown here taken from the left-hand pilot's seat, are a little out of place due to problems of photography. Actually, the large edge of the hood should fit farther to the left in between the raised edge of the glass and the spring loaded opening handle of the clear vision panel. Another picture shown, is a view from the right-hand pilot's seat and illustrates the high degree of success of this arrangement in eliminating any obstruction to the Instructor's vision—a very important consideration for training in the New York area. The spring clamp by which the panel is attached to the glare shield is reversable so that the hood can be fitted to either the left or right sides of the cockpit.

The other maneuvers on the check are pretty much standard air line practice, so I will not go into them in any detail.

The Link Trainer

The next item on the year's program, Link Trainer, is one on which there has been considerable unfavorable comment within the industry due to the relative obsolescence of the equipment and the fact that there is little similarity in the handling characteristics between the trainer and the actual aircraft. We are fully aware of these deficiencies but by modifying our, by now, ancient and venerable Link Trainers, equipping them with Curtiss-Wright automatic range and ADF equipment, converting this for VOR training, and by installing modern instrumentation such as Omni-Mags and RMI's, we are able to get great benefit from our Link department in the instituting of new procedures as well as maintaining competency on the ten or more types of instrument approaches, with which our pilots are faced over the routes which we fly extending from Chicago and New York on the west, to Hongkong on the east; from Scandinavia on the north, to Johannesburg on the south. Additionally under the heading of Link Trainer we include considerable personal instruction which comes under the title of, "Complete Review of the Route Manual and ATC Discussion." This consists of personal tutoring on and discussion of many of the finer and more obscure points of airways procedures and then the trainer itself is used to demonstrate the procedures much as one would use a laboratory instrument.

DC-3 Flight

Following up on the Link work is a DC-3 flight. Here again we have modified the aircraft as to its instrumentation and radio navigational facilities so that we are able to use this relatively inexpensive-to-operate piece to brush up on the niceties of approaches and area problems with a consequent eventual saving in flight training with the regular line equipment, because we are then not required to waste time on fundamentals.

Ground School Refresher

The next period, for which the pilot comes in is the ground school refresher, which is an intensive four-day course covering Systems and Designs, Emergency Equipment and Evacuation, Cruising Control and Performance. The examinations on this work are comprehensive and are carefully graded so that any unsatisfactory knowledge is uncovered and corrected before the pilot returns to the line. Recently we have added a fifth day to the refresher although it is not a mandatory requirement. On this day, we give several lectures by specialists on subjects which are designed to improve a pilot's general knowledge and to prepare him for developments within the industry.

Periodic Instruction Flights

Then, several months before coming in for the next periodic technique check, the pilot receives a flight of periodic instruction in his line equipment. We feel that this is the time when we can best raise the standard of proficiency of the individual and

Flier's Forum

'Collision-itis' --- Pros and Cons

I have just finished reading H. F. Hill's article "Collision-itis" in the current AIR LINE PILOT.

I wish, not only to congratulate him on a fine presentation of his subject, but to endorse his view ONE HUNDRED PERCENT.

I also feel that if a poll were taken among pilots flying into and out of congested areas, you might be surprised at the number that might do the same.

At any rate, speaking for myself, I say: Let's get going on this thing before it's too late.

CAPT. RICHARD THORNTON,
UAL, Council 34

* * *

I have read with interest, the article in the October issue by H. F. Hill, Jr. titled "An Antidote for Collision-itis?" and am impelled to comment on it.

I go along pretty much with Mr. Hill until he makes the fantastic statement that the facilities now exist, to handle all traffic at all times by current ARTC methods. They may exist somewhere, but certainly not in key areas such as New York and Chicago.

Only day before yesterday at Chicago, we were told that they were saturated and could accept no additional instrument flight plans for several hours. A few months ago at Albany, N. Y., with a ceiling of 10,000 ft. and 1½ miles visibility, we filed a flight plan on a little used airway (V-93) to ILG, a flight that should take about 1½ hrs. We sat on the ground at the end of the runway for 1½ hrs. before getting a clearance. A one-hour delay at any busy terminal is commonplace at this time, and this is during weather when only a fraction of the airplanes are flying that would be flying if the weather was better.

Mr. Hill's statement is fantastic, because ARTC cannot efficiently handle the traffic it now has, much less the great increase that would ensue if everyone filed IFR every time they flew. No one should know that better than an air line pilot. There is no doubt that everyone filing IFR all the time would reduce the danger of mid-air collision to a minimum. It would also grind air traffic to a crawl, which would result in thousands of people who travel by air to give up that means of travel for trips under 200 miles.

Incessant Delays

Most human beings would rather risk their neck than be subjected to incessant delays. The proof of this is the automobile casualty rate, yet 99 per cent of automobile drivers continue to speed, pass on hills, etc., in order to save a few minutes. We must not forget that the only justification for commercial air travel is to move people and cargo from A to B at a faster time than can be done by other means, and that means ramp to ramp time not airspeed.

To fly under IFR all the time with present facilities would cause all air travel to crawl and would ground many others, as the flight plans would not even be accepted; it happens frequently now. It is akin to suggesting that in order to avoid flying into a mountain (which has caused many more fatal accidents than collisions with other aircraft) we should just not fly over mountains, or better yet, if you wish the maximum protection from death in an airplane, do not get in one.

The point is, Mr. Hill is putting the cart before the horse. ARTC procedures and capabilities must be developed that can provide separation without incessant delays. When I can go out and get a clearance within 15 min. every time, I'll file IFR all the time. Not before, and any attempt to force it will throttle air travel.

ERNEST G. MARQUIS

give him the opportunity to polish up his skill which, while satisfactory from a minimum competency point of view, can often be improved by some judicious coaching. Here is where we find an entirely different relationship in the cockpit between the student and the instructor. On a check ride the main purpose of the flight is the student's unassisted performance of the required problems and the Check Pilot's evaluation of his abilities. On this periodic instruction ride, the attitude is one of complete assistance and a sincere desire to improve the pilot's competency.

Ground Instruction Period

The second six-month period is practically identical to the first with the exception that we substitute the four-hour ground instruction period for the periodic instruction flight. This period was originally treated with considerable skepticism but has now been unanimously accepted as a very worthwhile addition to the training program. The instructor in this case is a flight engineer specialist who, with a pair of pilots, completely covers the aircraft from stem to stern and inside out as to location of all equipment, its uses, and how it functions. This is, of course, an individual tutoring job and gives a pilot an excellent opportunity to straighten himself out on any points concerning which he is interested. The latter part of this period consists of going through all emergency procedures as realistically as possible including the use of all the emergency check lists. That in brief, is the program we are using at the present time.

Before closing, however, I should like to point out that this program is tailored specifically to our particular requirements and to our particular philosophy of operation both of which are influenced by the long-haul nature of our operation with the consequent minimum of actual take-offs, landings and instrument approaches. It is further influenced by the wide variety of countries and weather areas through which we operate. As such, this program will very likely not be directly applicable to any other type of operation and it is presented here only to stimulate your thoughts as to whether some of our ideas and methods might not be an advance over those presently in use, rather than an attempt to sell you on the idea of our program in toto.

Familiar Terminology Unmasked

You Won't Find These Definitions In Any Dictionary Or Standard Reference Work, But Maybe They'll Ring A Familiar Chord With A Good Many Pilots

EDITOR'S NOTE: *This revised vocabulary and nomenclature was submitted to* THE AIR LINE PILOT *by a pilot strictly because of the humor it contained. It is being published in the same spirit because, in looking at it from the lighter side, we feel there is a chuckle in for most everyone in the air transport industry.*

Revised Engineering Vocabulary

It is in process: So wrapped up in red tape that the situation is almost hopeless.

We will look into it: By the time the wheel makes full turn, we assume you will have forgotten about it, too.

A program: Any assignment that can't be completed by one telephone call.

Expedite: To confound confusion with commotion.

Channels: The trail left by inter-office memos.

Coordinator: The guy who has a desk between two expediters.

Consultant (or expert): Any ordinary guy more than fifty miles from home.

To activate: To make carbons and add more names to the memo.

To implement a program: Hire more people and expand the office.

Under consideration: Trying to figure a way out from under.

Under active consideration: We're looking in the files for it.

A meeting: A mass mulling by master-minds.

A conference: A place where conversation is substituted for the dreariness of labor and the loneliness of thought.

To negotiate: To seek a meeting of minds without knocking together of heads.

Re-Orientation: Getting used to working again.

Reliable source: The guy you just met.

Informed source: The guy who told the guy you just met.

Unimpeachable source: The guy who started the rumor originally.

A clarification: To fill in the background with so many details that the foreground goes underground.

We are making a survey: We need more time to think of an answer.

To note and initial: Let's spread the responsibility for this.

Let's get together on this: I'm assuming you're as confused as I am.

Give us the benefit of your present training: We'll listen to what you have to say, as long as it doesn't interfere with what we've already decided to do.

Will advise you in due course: If we figure it out, we'll let you know.

Nomenclature

Air Traffic: A concentration of numerous aircraft over a given point, each demanding the same route and altitude and each having a special priority.

Air Traffic Clearance: A verbal method of snarling the foregoing traffic.

Air Traffic Controller: An individual hated by pilots, airline executives, assistant controllers, passengers and veterans.

Alternate Airport: The last item of a flight plan. The airport toward which no aircraft ever has sufficient fuel to proceed to.

Approach Sequence: A laughable term applied to the dogfight in progress above a range station serving a terminal airport.

Approach Time: The time given to a pilot to keep him happy while attempts are made to figure out what to do with him.

Arrival Time: The numerical time assigned to a landing aircraft, which has successfully evaded other traffic during its descent.

Basic VFR Minimums: Those meteorological conditions under which a chicken can clear a low fence while maintaining satisfactory visibility.

Communications Center: Drafty, ill kept, barnlike structure in which people congregate for reasons believed to be dubious.

VRF: Stuff that aircraft are instructed to climb to and descend in accordance with.

VFR: Aircraft on collision courses in accordance with the above instructions.

Control Area: Airspace, in which only one center has authority to collide aircraft.

Cruising Altitude: The altitude assigned to be flown by a pilot, the figure to be indicated on the flight progress strip immediately adjacent to the circled altitude at which the pilot actually reports.

Departure: Aircraft unwisely leaving terra firma to mingle with other aircraft in the wild blue yonder.

Flight Plan: Yellow piece of paper, which arrives in center 30 minutes after aircraft concerned has checked over last radio fix.

Holding Point: Place at which aircraft are held within a short radius of, while awaiting further silly instructions.

IFR: Conditions under which colliding aircraft do not know for sure what they have hit in flight.

Rescue Control Center: Organization equipped to recover wreckage and bodies furnished by the ATC.

Separation: That condition, which is achieved when two or more aircraft fail to collide.

Control Tower: Ornate glass cage exceptionally good for sunbathing.

The ALP
CAMERA

Pleasant Duty

North Central's A. R. Lincoln with student stewardesses. Captain spends several hours lecturing to each new class of stewardesses.

Airworthiness Revie

Capt. L. H. Mouden, BNF, Airw- ness and Performance Study Com- tee chairman (sitting left) at H e Office to review correspondence n Safety Chairmen, with, l. to r., C. Weber, AA; B. Busse, EAL; L. n- man, UAL, Engineering and Airw- iness Advisory Committee mem ; C. F. Eck and T. G. Linnert, Al s Engineers, prior to Washington, C. Annual Airworthiness meeting.

Delta Pensions

Pres. C. N. Sayen and ALPA staff confer with Delta Negotiating Committee, at Home Office, to analyze company's proposal for retirement, before resuming negotiations.

ecutive Committee

Aug. 31 — Sept. 1 meeting, r. (seated): 1st V.-P. C. E. ley; Pres. C. N. Sayen; s. D. J. Smith; Sec. F. A. ncer; (standing): M. E. nson, v.-p., Reg. III; J. P. on, v.-p., Reg. II; D. S. Spain, , Reg. IV; W. M. Masland, , Reg. I; W. H. Drummond, , Reg. V.

MEC's At Home Office

UAL (below) and TWA (bottom picture) Master Executive Councils meet during September.

A Workable Repellent Finally?

Rain-Obscured Windshields Have Always Been A Problem To Pilots. Engineers Believe A New, Hardy Repellent Now Promises Relief

By Ken Calkins

Reprinted from BOEING MAGAZINE

Robert Johnson reads a lot of technical books and articles on chemistry. As a chemist in the Boeing Wichita division's process unit, his reading habits are understandable.

One day Johnson read about a silicone compound used to protect surfaces against the formation of a current-conducting water film.

Wichita's process unit had been developing a silicone as an airplane coating to resist high temperatures at supersonic speeds. These two unconnected incidents led to Johnson's big idea.

"I went up to the Boeing flight test radio in Wichita one day and listened to some of the pilots calling in," Johnson recalls. "One of them reported running into a squall and the windshield wipers couldn't get the rain off fast enough to give good visibility. About that time, I wondered why a silicone compound couldn't be used on the windshield to repel rain."

Silicones Explained

Silicones, compounds containing the element silicon, are stable and have an affinity for glass. In fact, the white sand from which glass is made is silicon.

Johnson and another process unit chemist, George Wheeler, who had developed BR-284, the heat-dispelling silicone, compounded another silicone formula, now called BR-11. This chemical, when properly applied to airplane windshields, forms an invisible coating less than a millionth of an inch thick which has proved to be highly effective in repelling rain.

Rain on an airplane windshield interferes with vision much as it does on an automobile. At cruising speeds, rain is not usually an obstacle to adequate vision for the pilot. The need for forward vision while cruising is not critical. Also, the plane travels at speeds fast enough for the airstream to clear the windshield. Or the pilot can take the plane to an altitude somewhere above the weather. But approach and landing speeds are too slow for airstream windshield clearance and too fast for windshield wipers developed to date. The wiper is at its best at slow taxi speeds.

Deflectors Tried

Water repellents applied to the windshield surfaces are one approach to combatting rain. Another is the use of deflectors similar to the plastic bug deflector attached to the hoods of many autos in the summer months. Tests, however, have shown that deflectors are ineffective for removing rain.

Another rain removal system is the deflective and evaporative effect of a hot air blast sprayed over a rain-soaked windshield. On jet airplanes this blast may be obtained by bleeding hot air from the engines.

The hot air nozzle was originally installed on F-86 Sabres as an anti-icing device. It was discovered to be an effective rain remover as well. On multiple jet airplanes such as the B-47 or B-52, however, engines are more remote from the windshield than on a single-engine fighter. The weight penalty of necessary ducting and equipment on the multijet plane would be more than a hundred pounds.

Believe Repellent Will Work

Engineers at both the Wichita and Seattle divisions of Boeing believe that repellent applications can handle the primary rain removal operation on airplane windshields.

Earlier repellents than BR-11 had a paraffin base. In tests, the silicone base BR-11 was found to dispel rain as effectively as the paraffin-base varieties and to be more durable.

For maximum efficiency, the paraffin-base repellent should be applied before each flight. BR-11 repellency has been good for as long as two and a half months, depending on abrasive wear on the windshield surface. The present method of applying BR-11, however, takes an average of an hour and twenty-five minutes to treat a surface which could be covered by a paraffin-base repellent in twenty minutes. Whereas the older type of repellent may be simply rubbed on a clean windshield in two applying and buffing steps, BR-11 windshield treatment is a great deal more involved.

The glass to be treated is cleaned with a special detergent emulsion also developed by researchers at the Wichita division. Then the windshield is sealed off under an airtight hood. A bottle of BR-11 is opened, placed inside the hood through a special access door. The door is closed and the chemical compound allowed to fume over the surface of the enclosed glass. The resultant coating causes raindrops to ball up and roll off the windshield instead of sheeting the glass with light-distorting water.

To test the effectiveness of BR-11, the repellent has been applied to the pilot's windshield on ten B-52s, the Boeing '707' jet transport, a C-97 Stratofreighter and 90 combat B-47 Stratojets on Air Force duty at two southern U. S. bases. BR-11 has also undergone tests at Air Research and Development Command facilities and at the Wright-Patterson Air Force Base.

Inquiries about BR-11 have come from major airlines. It is hoped that a test program can be set up utilizing planes from commercial fleets.

Passes Test

A. M. "Tex" Johnston, chief of flight test at the Seattle division, has tested BR-11's effectiveness on the '707.' On a rainy-day landing approach to Boeing Field in Seattle, Johnston reported he could see the runway clearly from over Elliott Bay, a distance of about three miles. His co-pilot, James Gannett, sitting behind an untreated window, could not see the runway until the plane passed over the Spokane Street viaduct, about one mile from the runway. The BR-11 application to the windshield had been made two months before.

Flight testing of BR-11 on a B-47 windshield at Wichita was done in both natural and simulated rainfall. A thirty-gallon tank was placed in the nose of the Stratojet and a nozzle mounted in front of the windshield. Water from the tank was sprayed on the windshield much in the manner of an automobile window washing device.

Flights were made at night to see if reflections from runway, factory and city lights on the repellent-treated glass interfered with visibility. Wichita test pilot Richard W. Taylor found visibility to be "much better on the treated

side than on the untreated side" in rainfall under night flying and reflected ground light conditions.

Several daylight flights were made in which the B-47 flew in the wash of a KC-97 aerial tanker spewing clouds of water from its refueling boom. The B 47 pilot flying in this water spray reported that the treated window afforded much clearer vision.

Flying In Wet Snow

Then, to simulate flying in wet snow, both planes began a climb. At an altitude just below that at which freezing temperatures are encountered, visibility through the treated half of the windshield remained good while the untreated side tended to sheet over with a film of water. Altitude was increased at a speed approximating that of landing approach. The glass-heating element was turned off. Water on the BR-11 surface froze in tiny droplets.

"It was easy to see between the ice particles . . . ," Taylor said later. "The untreated side started to freeze over, and quite a bit of slush, comparable to wet snow, formed on it. On the treated side, this condition did not prevail. On that side it was as though you were looking at a photographic film that had been greatly enlarged showing up the grain in the film."

Boeing engineers, who have been associated with the BR-11 project, believe they have the answer to rain-clouded windshields. They are confident that further tests will substantiate their findings.

When the new repellent has been proved, it could be put in use on all types of Air Force, commercial and private planes. And because it is heat resistant and stable, BR-11 is ready for airplanes of the future.

PAA Pilot Retires After 38 Years Of Flying

By Capt. William P. Monan
PAA

On September 1, 1955, Captain George Rumill, Pan American Airways pilot, retired from the airline. Although not the first PAA pilot to reach the retirement age of 60, Captain Rumill's departure is of special significance to the Miami Council No. 10 pilots: George is the first ALPA member to retire from this Council.

When George put away his flying gear, he could look back on 38 years of flight, ALPA membership since 1934. George closed his logbook at 24,000 hours in the air, filing away one of the oldest CAA licenses in the industry—number 264.

Began Flying In 1917

Captain Rumill began his flying career in 1917, before most of his copilots were even born. Winning his ensign's wings in the Navy before World War I, George began his years of roaming the world.

He first flew Curtis planes off the coast of England, assigned to the North Sea Patrol. Rumill flew one of three F5L flying boats off the Virginia Capes, participating in the crucial tests of airpower vs. seapower, then being advanced by the late Brig. General Billy Mitchell.

In 1921, Captain Rumill's squadron of five flying boats made Navy history when it flew from Cuba to Panama, the first airmen to reach the Isthmus. Those were in the days of real pioneering in the air: their F5L seaplanes, powered with two Liberty engines, cruised at 52 knots with a 400-mile fuel range.

Barnstorms Country

For almost a decade after leaving the Navy in 1922, Captain Rumill barnstormed the country, thrilling the country side with his upside down flying, precision formation, wingwalking and parachute jumping. During slack seasons, George patched up airplanes, folded chutes and experimented in the air. He mounted a camera in a plane's hull and flew aerial photography missions. He even converted a Fairchild flying boat into an amphibian by rigging up a retractable gear pulled up by ropes hanging out of the cockpit windows.

Capt. George Rumill

1931 found Captain Rumill busily flying Ford Trimotors across Cuba. It was at that time, that George decided to seriously settle down to globe-trotting as a career: he became a PAA Clipper Captain.

Flies China Sector

His first assignment was in China, flying the Shanghai-Canton-Hong Kong sector. In 1934, George was transferred to Brazil, flying Sikorsky S38s up the Amazon River from Belem to Manaos. Eight months later, Captain Rumill shifted to Trinidad, flying the shuttle amphibian service from Port of Spain to Barranquilla, Colombia. Operating conditions in those days on the North Coast were uncertain and difficult. Several times, Captain Rumill was forced down at sea with engine trouble.

In 1938, after a prolonged siege of dysentery, Captain Rumill transferred to Miami's famed Dinner Key base. He flew the Sikorsky seaplanes through the West Indies, the big Martin flying boats to Panama.

Progresses To Boeing 307's

The era of seaplanes came to an end and George moved from the DC-3 to the four-engine Clippers. He flew the Boeing 307, the first of the Stratocruisers, through Central America, Mexico and Panama. He brought the first plane into Oakes Field in Nassau, Bahamas.

During the Korean campaign, Captain Rumill was one of the first pilots to fly military flights across the Pacific to Wake Island and Tokyo.

Now at 60, George Rumill is looking forward to pleasant years of fishing, boating and pure loafing. But he can also look back on 38 years of globe-trotting, in Jennies and 4-engine Clippers, in seaplanes and landplanes, in 30 horsepower crates and 12,000 horsepower transports.

The world is a smaller place than when George first began his career. But there always will be room for men like George Rumill—quiet, unassuming and a tip-top professional pilot.

Use It Or Lose It

Communities Served By Local Service Must Use It In Order To Keep It

By Keith Saunders

Reprinted from NATIONAL AERONAUTICS

A new standard of air service availability is going to emerge as a result of the passage by Congress of the legislation providing for permanent certification of the local service (feeder) airlines. No longer will any community with an adequate airport, an aggressive chamber of commerce and some political influence be virtually assured of scheduled airline service.

Under the new law, only those local service intermediate route points generating a minimum of five passengers enplaned per day (approximately 300 per month on and off) will qualify for permanent certification. All other stations except under unusual circumstances, will have to demonstrate at the end of a temporary period that they are generating a sufficient volume of traffic to warrant a continuation of scheduled airline service.

In other words, a considerable number (approximately 100 by present estimates) of small towns that now have airline service are to be faced with a situation in which they must use it to a greater extent than heretofore or they will lose it.

Balks At Payments

The Federal Government has served notice that it is anxious to be rid of most of the more than $20,000,000 a year in subsidies, now being paid to local service airlines, even though it recognizes that this essentially is subsidy to the low-traffic route points receiving such service rather than to the airlines themselves. Uncle Sam has become a bit tired of paying Clearwater Airlines far more in subsidy for its two daily stops at Podunk Center than the airline collects in passenger revenues at that station. The permanent certification bill puts it squarely up to such communities in words to this effect:

"If your community warrants scheduled air service, as your spokesmen so eloquently told the Civil Aeronautics Board several years ago, it's time you proved it by putting more than three or four passengers per day on your local airline's planes. If you want to continue enjoying the benefits of scheduled airline service, use the service that's now yours for the using."

Air Lines Take Action

Several of the local service carriers, having seen the handwriting on the wall, have been waging "use it or lose it" sales campaigns in the territories they serve. Some of these have met with fair success; others resulted in no appreciable increase in traffic. The trouble was that the communities didn't really believe they would lose their air service simply because of non-use. They felt that the mayor, the chamber of commerce, and their Congressman could talk the CAB into keeping them on the nation's air transport network. If there ever was any ground for entertaining such a belief, the new law eliminates it. "Use it or lose it," as the phrase pertains to local air service, will henceforth mean just that.

The average passenger load factor of the local service airlines has been only about 45% (as against an average for the trunkless of over 65%), and this simply is not enough. The local service lines are flying far too many empty seats around their routes, and Uncle Sam is paying subsidy for those seats, which revenue passengers could and should be occupying.

Up To Communities

It is now crystal clear that the communities wanting scheduled air service must use it in order to keep it. The CAB's minimum requirement of five enplaned passengers per day is quite reasonable in view of the high level of business activity, the general economic well-being, and the great amount of traveling that is being done in this country.

It shouldn't take much doing in most of the local service communities to build up sufficient air-mindedness to enable this challenge to be met. Let's see it done.

MAA Enrollment Extended For Limited Period

In order to correct some isolated inequities, the Mutual Aid Board of Directors has voted to open MAA to all ALPA members in good standing, for the limited period November 1 to November 30, 1955. This limited offer will not affect apprentice members who, as in the past, are permitted 18 months from the date of their active membership to join the Plan.

In order to defray the cost of additional temporary clerical help which will be needed to process the new applicants expected, the Board advised that a non-refundable processing fee of $1.00 will be charged to all applications received during this period.

Deadline Noted

Applications must be postmarked not later than November 30, 1955, *must bear the Council Chairman's signature* and must be accompanied by a check for $26.00 for Class I, $51.00 for Class II. Approved applicants will become members *effective January 1, 1956.*

Prospective members (and present members) are invited to carefully read the MAA By-Laws with particular regard to the exclusions. Attention is called to the fact that no benefits are paid for disabilities arising from or connected with a condition that existed at or prior to application. Pilots with conditions that are disqualifying are invited to write the Board regarding limited coverage.

Limitations Cited

Claims arising from psychic or mental disorders are normally excluded with particular reference to personality maladjustments. No claims are paid on emotional conditions incidental to failure to pass proficiency checks nor will any claims be paid as part of a retirement program.

Since its inception, MAA members have paid 106 claimants $195,397.00. Three claims have been rejected. The average cost has been $2.25 per month per member.

MAA, like other phases of ALPA's benefit program, is a self-sustaining entity receiving no financial aid from the parent organization other than office space. Inquiries are invited regarding the By-Laws, the use and investment of the capital fund, or the operation of the Board.

Today's Air Navigation

Two Big Problems Face Air Traffic Control: An Increasing Amount Of Traffic Squeezed Into Decreasing Space. Solution: Economical Utilization Stretching As Far As Possible

By F. B. Lee
Administrator Of Civil Aeronautics

As pilots, most of you are aware of the problems we are facing today in the field of air navigation and traffic control. What is probably not so well known is what we are doing to solve them.

Basically, we have two big problems, first, a decreasing amount of available airspace and second, an ever increasing amount of air traffic. This double problem makes for the classic vicious circle. As our air traffic increases, it affects our airspace, and as our airspace is reduced, it makes traffic control more difficult.

Lack Of Airspace

Of the two problems, the one of airspace is the most serious. Man-made devices and ingenuity can cope with anything—and that includes air traffic. But airspace is quite something else again. There is just so much of it and when it is gone there is no more. The best we can do is to utilize it in the most economical manner that we know how.

Let us look for a moment at what has been happening to our airspace and why it has become of such great concern to everyone associated with aviation. In recent years great chunks of this precious commodity have been reserved for one worthwhile reason or another, and through this reservation, the use of the airspace necessarily has been restricted to others.

CAA Standards

The CAA, acting for safety, is a major user of airspace. We have set standards for instrument flight rules weather that require 10 minutes' separation between aircraft operating at the same altitude. Add to that the 1,000 feet of vertical separation required between levels of flight and you can readily see how much airspace is used up in the operation of 70,000 miles of low frequency airways and approximately an equal amount of VHF airways.

However, the clamor for reserved airspace comes from many sources outside of regular aviation needs. The military services require large blocks for air and ground gunnery, bombing practice, guided missile tests and for instrument flight training. There are restricted and prohibited areas over atomic plants and atomic testing grounds. Tall television and radio towers have been erected, and are planned for, on or near airways, especially in the Plains States. Flying is prohibited over a large section of down-town Washington. In fact there are now some 450 restricted areas scattered across the country. This number is just about double the number back in 1948.

Jets Create Problem

And last but not least we have jet aircraft. Jet aircraft might be considered a necessary evil as far as airspace is concerned. We all know of their operating characteristics, the enormous fuel consumption and as a result the special handling required in terminal areas. The space-consuming jet penetration and missed approach procedures tie up large parcels of airspace in terminal areas where there is a mixture of jet and conventional traffic.

The jet problem extends up above the terminal areas to the high altitudes. At 29,000 feet and above, vertical separation of 2,000 feet is required while still maintaining the 10 minutes horizontal separation. This has the effect of reducing the amount of available airspace above 29,000 feet by one-half.

The military jets soon will be joined by their civilian counterparts and the

Sporting four brand new platinum and diamond "Hat-in-the-Ring" pins, these veterans represent 100 years of flying for Eastern Air Lines. Picture was taken at the DeLido Hotel at Miami Beach on October 5, immediately after a banquet at which 350 Eastern executives from 24 states, Puerto Rico and the District of Columbia paid tribute to fellow employees who have been with the company 25 years. Not shown is Capt. R. K. Smith of Miami who attended the dinner, but had to leave early in order to take out a scheduled flight the next morning. L. to r. are Captains J. Shelley Charles, Atlanta; Frank B. Kern, Miami; H. O. Hudgins, Miami; John F. Gill, Newark.

airspace problems will be further complicated.

These are the airspace problems that are at hand or are facing us.

What is being done to solve them?

ACC Airspace Panel

The decreasing airspace problem is not a new one, even though it has become worse in the past few years. The problem was recognized years ago and since shortly after World War II a "watchdog" group has been supervising the allocation and use of airspace on a national basis. This group as you know is the Washington Airspace Panel of the Air Coordinating Committee, with sub-groups located in conjunction with the CAA Regional Offices. The Washington Airspace Panel, incidentally, is a new name for what was formerly known as the Washington Airspace Sub-Committee of the ACC.

The Airspace Panel, with its Government and Industry representation, has done a tremendous job of guiding us in conserving our airspace. We will continue to look to it for sound recommendations arising out of new requests that will surely come for airspace reservations.

RAPCON Centers

Also on the positive side is the RAPCON or Radar Approach Control Center program being operated jointly by the Air Force and the CAA. This cooperative venture in traffic control permits a sharing of the airspace at locations where there is a heavy concentration of military and civil traffic brought about by close proximity of a civilian terminal and an Air Force installation.

A standard RAPCON installation consists of three surveillance and two precision approach radar units. Under the program the CAA operates the surveillance radar units while the Air Force operates the precision approach radar for actual landings at military bases under instrument flight rules conditions. Generally, the landing aids at civil airports in the RAPCON areas are Instrument Landing System installations.

18 Installations Planned

The RAPCON program has been very successful to date. There are now three such centers in operation out of the 18 which eventually will be in use. The three RAPCONS now operating are at MacDill Air Force Base at Tampa; McChord Air Force Base, Seattle, and Tinker Air Force Base, Oklahoma City. Cooperation and a desire to solve a common problem have been the keynotes in the RAPCON program. The Air Force has and will furnish all the radar units while the CAA will provide the personnel and the air traffic control know-how.

I can report, also, that the CAA and the Navy Department have held preliminary talks regarding the establishment of a similar program between the two agencies. The Navy version of the RAPCON program is known as Radar Air Traffic Control Center. Final details have not been worked out as yet but it is my understanding that they will serve fundamentally the same purpose as the RAPCONS, that of permitting more effective use of specific blocks of airspace.

High Altitude Control

For some time now we have recognized the need to control more airspace at higher altitudes. To accomplish this, it is our purpose to control traffic above 25,000 feet. Studies now underway will determine whether such control will be on an area or a route basis.

No decisions have been made as to how we shall control the airspace over the 25,000 foot level. The problem still is in the study stage and we are searching for realistic, practical solutions. Once these decisions are reached, we hope to proceed rapidly with their implementation.

New System Needed

One of the problems which must be solved in employing this type of control would be the method of presenting the required information to our air route traffic control centers. The old standard flight data strip that has been the backbone of en route control for many years, might have to be changed. It may be that we shall have to go to panoramic type displays in order to provide the proper information to the controllers.

Our Air Route Traffic Control Centers have been conducting some exploratory dry-runs with map type displays to trace the movement of en route aircraft. However, we do not know as yet if the panoramic display is the complete answer we are looking for.

Generally these are the airspace problems with which we are confronted. Undoubtedly, others will arise from time to time. As far as CAA is concerned, I can promise you we shall attempt to solve those which fall within our area and at the same time do everything possible to use the airspace carefully against the time when our increasing air traffic will put new and unforeseen demands upon it.

Air Traffic Problem

That brings us to the second of our big problems—the air traffic. Unlike airspace, air traffic is something positive, something tangible and concrete. We know what it is, we can predict its future within limits and we know we can deal with it if we have the proper tools with which to work.

The overall problem of controlling air traffic and keeping it flowing safely and smoothly along the airways and into terminal areas has narrowed down to one of staying ahead, or at least abreast of, its tremendously increasing volume. This has not been an easy task nor do we foresee any lessening of the problem.

The volume of traffic along the airways is best represented by the number of fix postings, or as you all know, position reports of en route aircraft.

Fix Postings Increased

In 1948 the CAA Air Traffic Control Centers handled approximately 8.5 million fix postings. The year 1951 showed an increase in fix postings up to 11.8 million and it jumped to 16.8 million in 1954, an increase of 12 percent over the 1953 figure. The year 1954 represents an average of 46,000 fix postings in every 24 hour period in our 27 continental and four territorial Centers.

A large number of these fix postings were for jet aircraft, and while the en route traffic problem as a result of the increase in high performance aircraft operations has not reached the acute stage, we know it will increase as more jets are added to our military air fleets and as civil jets go into large scale operations. They have as yet not become a serious problem in terminal traffic control, however, we do anticipate that they will add to the complexity of traffic handling.

No Preference For Jets

Our present-day traffic control system is based on the long established concept of, "first come, first served." There was, of course, no provision in the system for juggling approach sequences. Jet aircraft—military or civil—cannot tolerate approach delays as we know them, or holding in stacks. On the other hand, we cannot penalize conventional aircraft operators by giving priority landing clearances to jet aircraft. The solution to this problem is going to be a difficult one. I do not know what the ultimate answer will be, but for the time being at least, we be-

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believe that jets will have to compete with other traffic on an even footing except when special handling will not interfere with the regular flow of traffic.

Just a year ago the CAA predicted that the fix postings would number 24 million by 1960. This would be almost double the 1952 total. We have looked a little further into the future and have come up with a yet unpublished prediction of 28 million fix postings by 1965.

The increase in fix postings during the past year is, of course, reflected in the figures for traffic handled at terminal areas, one of the trouble spots in our air traffic control picture. CAA air traffic control towers handled 17.9 million aircraft movements during 1954. This was an increase of 1.1 million over 1953, or a seven percent gain.

Difficult Job

These statistics clearly show how the air traffic has increased and what it is likely to be in the future. It is the task of the CAA to see to it that the air traffic, no matter how heavy, keeps moving along the airways and down to the runways at our busy terminal airports. We have problems of traffic after the aircraft get down to the runways—but that's another story entirely. We realize after being in the traffic control business all these years that we have a difficult job ahead. Danger signals have appeared from time to time to impress upon us the need for new equipment and improved techniques.

New York Jam

The most recent and ominous of these signs appeared in the New York area on September 15, 16 and 17, of 1954. It will be a long time before the traffic controllers in the three major airports in the New York area forget those three days. They refer to the whole period as "Black Friday." Most of the facts are well known in the industry. To put it mildly we really had a traffic jam up there. At one point, for nearly an hour we were not accepting any flight plans whatsoever. Inbound delays were running up to 90 minutes at LaGuardia. Outbound delays ran up to one hour, 53 minutes at Newark. Idlewild was in no better shape. This all took place while our controllers racked up an all time record for IFR operations for one day in the New York area.

The delays around New York during those three days were felt far to the north, south and west. We believe we now have the New York situation well in hand. The Air Force generously

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New Idlewild Center

We are in the process of establishing a new Air Route Traffic Control Center at Idlewild where we will have a permanent long-range radar of our own. This new Center should be ready for operation some time this year. Meanwhile, tests indicate the Air Force radar at Mitchell Field will help solve our problem.

We are in the process of taking further steps to correct the situation at New York. After intensive study, we have decided to install another Instrument Landing System at Idlewild Airport. When installed, it will mark the first time that two ILS systems have served the same airport. It has not been determined as yet what runway the new ILS will serve. There is a slight possibility that it may be on the opposite end of the runway that now has an ILS—or it may be on a completely new runway planned by the Port of New York Authority.

The difficulty with controlling air traffic is that the problem differs from location to location. There is no set formula, which if successfully applied at one location, would solve the problem at another location.

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The Air Line Pilot, published monthly at Chicago, Ill., for Oct. 1, 1955.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Air Line Pilots Association, Int., 55th St. and Cicero Avenue; Editor, Ed Modes, 55th St. and Cicero Avenue; Managing editor, None; Business manager, None.

2. The owner is: Air Line Pilots Association, Intl., 55th St. and Cicero Avenue; Clarence N. Sayen, President; Charles Beatley, First Vice President; F. A. Spencer, Secretary; D. J. Smith, Treasurer, all of 55th St. and Cicero Avenue.

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(Signed) ED MODES.

Sworn to and subscribed before me this 19th day of September, 1955.

(Seal) JANET PUTZ.
(My commission expires Nov. 9, 1957.)

Laboratory Tests

There are steps that can be taken, however, to find solutions ahead of the problems. We realize that what happened at New York can happen elsewhere such as at Chicago or any other of the major terminals. But in order to reach solutions before the situation becomes acute in any certain area, we have successfully used the Dynamic Air Traffic Control Simulator at our Technical Development and Evaluation Center at Indianapolis. By use of the device which is a joint project of the CAA and the Air Navigation Development Board it now is possible to project and solve the traffic problem at any location right in our Indianapolis laboratory using experienced air traffic controllers and pilots of simulated aircraft. Studies on potential traffic problems in the Fort Worth-Dallas area, Washington, Chicago and Norfolk areas have been completed and appear to result in the correct answers.

We in CAA believe one of the solutions to the en route traffic problem would be the use by CAA controllers of existing military air defense radar.

Civil Radar

This may be possible in some areas without compromising military requirements. In other areas it may be impossible because of military use and cost of remoting. It may be necessary to install civil radar at some locations. For example, we now are conducting a study to determine how best to provide full radar coverage for en route traffic between the heavily congested areas between Norfolk and Boston and New York and Chicago. And the answer may require several civil radar installations. If so we shall propose budgeting provisions for the necessary equipment.

I have touched briefly and generally on our airspace and traffic control problems.

We know they are serious and must be solved if we are to have a sound aviation.

We have no doubt that they can be solved. It will be expensive — it will take cooperation from all segments of the aviation industry, both civil and military, but we are confident this will be forthcoming.

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